

Health Economics

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Week – 08

Lecture 36- Theoretical Foundations of Economic Evaluation- I

Welcome once again to our NPTEL MOOC module on Health Economics. Without discussing the background much, I think we will immediately introduce the new week. It is quite contemporary in nature, and it has huge applications. However, to understand this week correctly, we have titled this as 'Theory and Principles of Economic Evaluation'. This has 6 lectures.

To start with, we will give you a background of the economic evaluation. So, we need to take a journey to understand the theoretical foundations of economic evaluation. As we know already, we have discussed health systems, their types, and features. We also understood price reasoning, different health insurance schemes, and their directions, such as uncertainty, dealing with uncertainty such as adverse selection, moral hazard, non-price competition, etc. So, we will now be emphasising the evaluation and its background. You can easily find the clear difference between positive and normative economics in the picture below-



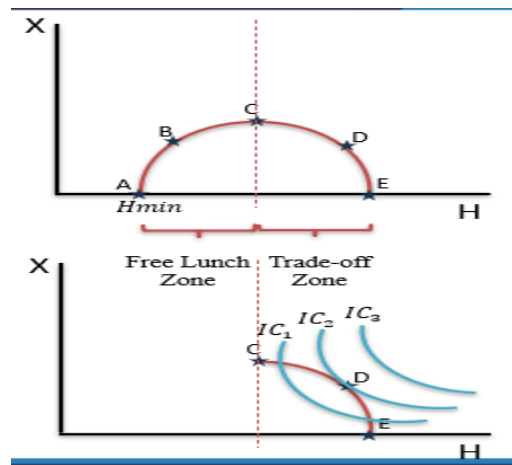
Based on the normative one we used to refer to the norm and principles. On the other hand, in the positive one, we usually refer to issues such as descriptions of economic variables like trends. Then, we derive some testable hypotheses about the relationship between the variables, and accordingly, we explain and predict future trends. For example, when we analyse the government healthcare system, we hypothesise that government-provided healthcare increases public expenditure. So, that is basically a testable hypothesis, and that is achieved through positive economics discourse.

Now, we need to clarify normative economics, which is part of our economic analysis and usually clarifies the judgments, and, in this case, we usually explain making judgments about the relative desirability of alternative economic outcomes. Like making judgments about the best option among alternative ways of delivering healthcare. So, usually, it is in a futuristic context and very difficult to observe based on real-time data. However, since it is normative, we usually drag its direction to different norms. Hence, the extreme possibilities are emphasised. So, given this backdrop, what are the objectives of this lecture? We will explain how normative economics underpins economic evaluation principles and practices and show how these provide the theoretical foundations of economic evaluation methods.

Let us introduce the evaluation. What it is all about? So, economic evaluation refers to a broad range of analytical techniques used to describe and compare the benefits and costs of competing uses of resources, as mentioned in Morris et al. (2012). In economics, both positive and normative approaches can be used for evaluation. However, as the nature of both differs, the choice of approaches also differs with respect to the change in the area of economics. For example, when we discuss financial economics, we usually use positive economic evaluation. Whereas, in the environmental context, we used to take the help of normative economics evaluation.

With respect to healthcare, the economic evaluation is said to be normative in nature as it has certain connections with the human body, which is largely derived from nature. Moreover, healthcare has a number of implications and linked to the surroundings; hence, it is looked at from the perspective of normative discourses. It is normative in two ways. What are these? One is perspective-based, which explicitly or implicitly concludes that one treatment is better than another after weighing up the cost and benefit. The second one is value judgment based, where value judgment is usually a subjective assessment of what is considered valuable or desirable. It encompasses decisions about measuring and valuing benefits, what constitutes a cost and how to weigh trade-offs between different options.

Why is the role of prescriptions and value judgment important, especially in the normative economics evaluation we have just discussed? In practice, health benefits a person enjoys, involve sacrificing resources from other goods, which we discussed by comparing health goods (i.e., H) against other consumption goods (X). The trade-off between X and H is discussed in detail in our Grossmann and 'demand for healthcare' chapters. However, again, we will revisit this. This is how (if you recollect correctly, I am sure you can understand) the production possibility between H and X tending from the 'minimum level of H' to H. This is not the case (see video) at all. This is rejected (as we already said). Usually, we explain in this context that if it is two economic or two consumption-based goods, then that is a possibility. Whereas, in health care, it starts from the H minimum where we emphasise the free lunch and trade-off zone. We mentioned that optimisation is usually discussed in the trade-off zone, where we compare H and X but after the free lunch zone.



So, in the trade-off zone, we usually discuss individual trade-offs between health and consumption of other goods. And especially in Grossmann's model, where the prediction is that while optimising utility, people choose a combination of health and other goods, leading to less than H maximum. We discussed the free lunch zone where a person has both H and X, and both can be increased, whereas, in the trade-off zone, one has to compensate or compromise one thing for the other. Hence, optimisation or utility optimisation is discussed, and the trade-off zone really matters in deriving the best optimal zone. For this, we can refer to the respective Grossmann model chapter, which we have clearly discussed with its theoretical foundation. The Grossmann model showed that the trade-off between H and X is very inevitable. As a result, the desirability of any given option invokes perception and value judgments about the extent to which such trade-offs are acceptable and desirable. Therefore, the theory and practice of economic evaluation in healthcare is inescapably normative in nature.

There are different approaches within normative economics. We will discuss this. One is called welfare economics based, which is called welfarism, and another is called non-welfarism. We will emphasise one by one. In terms of the welfarist concept- The term welfarist was coined by Professor Amartya Sen in the year 1977 and this is a systematic analysis of the social desirability of any set of arrangements (say, maybe- allocation of resources) solely in terms of individual utilities for evaluating economic policies. Meanwhile, in the context of non-welfarism, non-welfarist positions may include perspectives that emphasise concepts like justice rights and other values beyond individual welfare.

Welfare economics, we again say, is based on the principles of normative traditions in economics. The objective is to devise a set of rules to achieve those logical and consistent ranking of all alternative social states. For example, how scarce healthcare resources are better allocated, and which of these might we have to choose? In this case, the answer is that there are many different ways to achieve this allocation. Maybe by delegating decision-

making to politicians and relying on their judgments on the best societal need or the other option is to follow an autocrat. If a democratic format is chosen, it might be confusing again. Hence, in these two directions, a clear choice is possible. However, assessing desirability is different in the context of welfarism.

There are three major characteristics of welfarism. Starting with 'individualism' in welfare economics. The views of individuals are affected by choice function, which is largely related to information. And the information helps them to make the best social choices. Additionally, an individual is the best judge of him or herself in terms of behaving in a way that maximises their utility. Hence, we discuss welfare economics in the social welfare context as a societal measure of well-being, exclusively identifying the product of utilities of the individual members and cumulatively optimising the social welfare.

The mathematical operations or the representation of these individualist perspectives of social welfarism or the welfarism direction is basically a function of all individual utilities. These can be represented as-

$$SW(x) = f((UA(x)) (UB(x)) \dots \dots (Un(x)))$$

where,
SW= Social welfare, U= Utility, x= state of the world,
A,B...n= individual.

So, it is mentioned that SW is social welfare. The U stands for utility, representing the utility of A, B, C,....., n. Here, the range from A, B and till n, represents different individuals. X is the state of the world, and given the state of the world, we can discuss about social welfare. The equation is also called the Bernoulli-Nass social welfare function.

The second characteristic of welfarism is called consequentialism in welfare economics. It stresses that welfare economics centres on the consequences of people's choices, especially their consumption patterns. Utility associated with their consumption of goods and services, is either neutral or independent of their allocation process, whether it is a market, political or other process. So, in every case, we will find utility attached to it. The generation of utility is not only from our own consumption but also through external consumption, such as the consumption of those we care about. It is also part of the consequentialism concept of welfare economics.

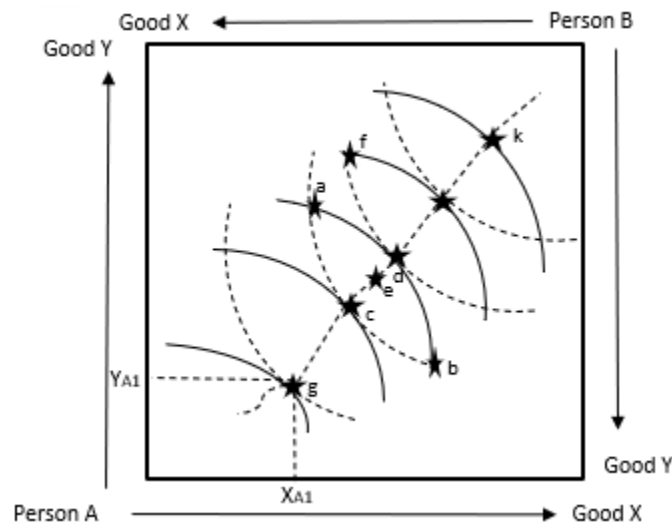
The third characteristic is called the aggregations, which is very difficult. The primary challenge in welfare economics is finding a defensible basis for aggregating and combining people's preferences. One of these goals is to establish a decision rule for aggregating people's choice function, which involves addressing trade-offs measured in terms of their utility. Hence, the desirability arises from the trade-off between people's utilities. So far, No objective way exists to resolve such trade-offs to aggregate their welfare. So, it is largely subjective and involves value judgment.

This brings us to the discussion of the Pareto principles of welfare economics, which is considered one of the best methods of value judgment. It is also known as the most basic

judgment used in our theoretical framework of welfare economics. The Pareto principle serves as a foundational framework for evaluating states of the world and social choices. So, value judgment is indeed the heart of welfare economics, as proposed by Pareto in 1906. You can read about it in the paper of Busino in 1987 for this. As per definition, 'the Pareto principle assesses whether a state or an action is preferable if it makes at least one person better off without making another worse off.' The situation is called Pareto optimality.

This refers to the unique combination the society has achieved and if any dismantling attempts are taken, that is going to compensate one for other, one of them would be at the level of or content of loss. Hence, welfare economics uses the Pareto principle to determine if a change or policy benefits society without harming anyone, making it a key tool for policy analysis. So, Pareto's role in theoretical foundation- Pareto plays a critical role in establishing the theoretical foundation of economic evaluation. Pareto concepts are usually discussed in two aspects. First, it provides a basis for judging a given situation as optimal. Or second, for ranking states relative to each other based on utility obtained by each person in each state.

The theoretical foundation of Pareto analysis is deeply rooted in consumer choice theory. And it requires each person to choose their bundles and consistently rank those bundles of goods, indicating stability and even transitivity preferences. So, how does the Pareto principle work? The goal of Pareto analysis (indeed of welfare economics in general) is to aggregate these preferences to produce social welfare ordering. So, here, if you go back to your microeconomics chapters. At the end of advanced microeconomics chapters, we used to have a general equilibrium model and Edgeworth box diagram. Again, we are referring to the same Edgeworth box diagram to explain Pareto principles.

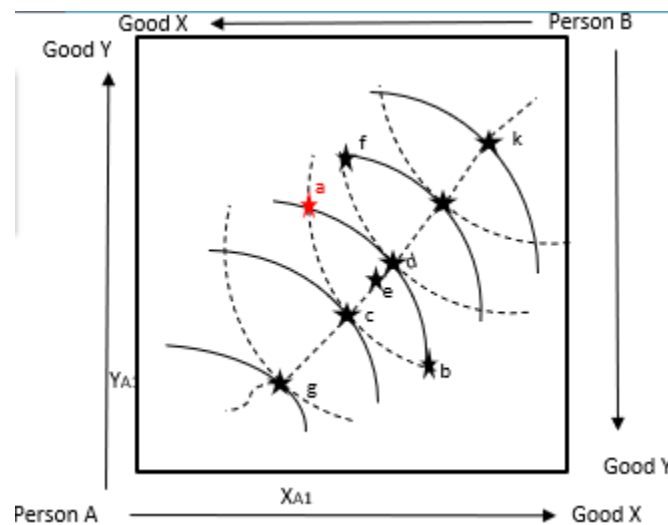


We have adopted this figure from Maurice's (2012) book and will systematically clarify the concepts within the diagram. Here, it shows two commodities, X and Y (goods X and Y), and in the extreme two corners, we have the two people (A and B) and their choice functions. And if you remember, we used to have two independence maps. One from the corner of

consumer A and in reverse, another from the corner of consumer B (see figure). When you see this, you will find a clear difference. This is the indifference curve of person B and the other persons' (A) indifference curves, which are plotted in reverse. The diagram, also called the Edgeworth-Bowley box, maps each individual's preference function. The lengths of the X and Y axes explain the quantity of goods X and Y. So, at every feasible point, unique allocation is defined.

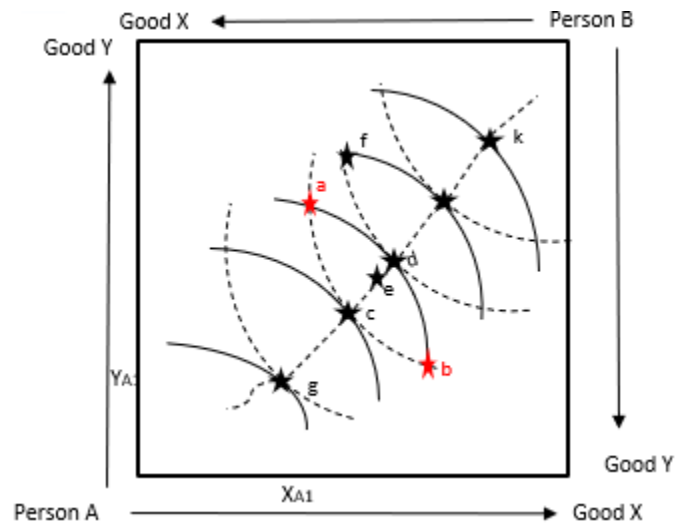
Now, we will discuss the best possible bundles, where both consumers simultaneously try to reach their optimum level of satisfaction. The Pareto principle offers a means of identifying which of these points can be considered socially better than another one. Counting any points lying near person B indicates a higher utility for person A and vice versa. Pareto principles indeed mean identifying those points that would derive the best satisfaction without compromising someone else's satisfaction. We will now start to highlight the best possible indifference curve each of the persons A and B can attain, which is highlighted over here.

Let there be two people (A and B) and two goods (X and Y). Further, let us assume a pure exchange-based economy to highlight the Pareto optimality function (the explanation is mentioned in this diagram).

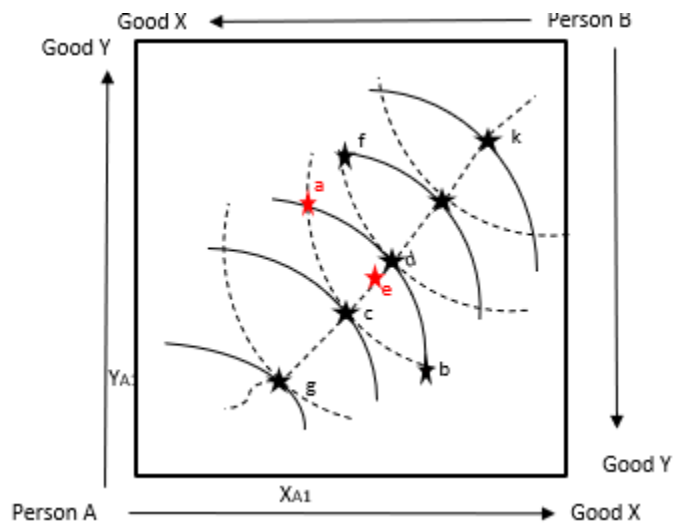


If you look at **point a** in the allocation. Person A can change what goods he has by choosing to exchange his goods with person B. Point **a** (highlighted in red colour). And what can we say about the overall social welfare in this situation? We sometimes count the egalitarian approach, that is, allocating the goods X and Y equally by dividing the share by half. However, by contracts, the welfare economics approach focuses on the utility of each person that he/she enjoys from the consumption of X and Y. So, if one person strongly prefers goods A rather than B. Then, equal allocation or allocating the two goods in equal amounts will clearly not maximise individual or joint welfare.

Now, we are explaining three cases of alternative allocations. The first case is having two points a and b which we have highlighted here, which are actually indifferent to both persons.



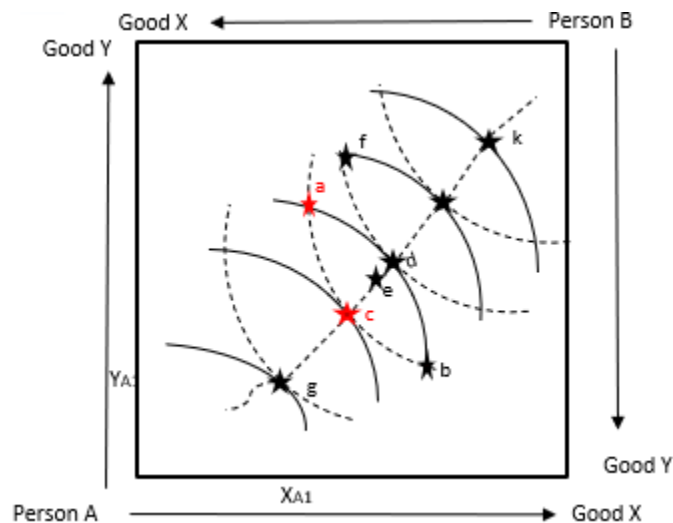
In other words, if we start at point a and shift to point b. Both person A and B are on the same indifference curve. And both persons can easily exchange their basket of commodities. So, what can we say about the overall social welfare in this context? Since both experience exactly the same level of utility at a as they do at b. Each of them is as well-off as before. Now points a and b are called Pareto indifferent. In terms of overall social welfare, both points are identical and will be ranked equally. In the egalitarian case, anything between the two parties is usually considered to be divided equally.



In the second case, we start again from point a and shift to point e (at the centre), and the centre is usually known as the contract curve. The outside eye-like structure is called a ridge line, and the centre one is called the contract curve. For both person A and B, there will

be a shift to the indifference curve further from the origin, i.e., from point **a** to **e**. So, both experience higher utility and the new allocation that is good for both, is called weak Pareto improvement. Earlier, for points **a** and **b**, we discussed and plotted two points and tried to see that these two points are actually indifferent. However, there is a possibility of a third possibility, the average path, the middlemost point, i.e., on the contract curve. If we highlight point **e** and the new allocation is good for both persons, we cannot strongly mention that if we are to attend **e**, we are compensating another one, or there will be some trade-off. Since there is no trade-off to reach **e** and both are gaining, of course, this is called Pareto improvement, but that is called weak Pareto improvement. Pareto rather discusses the best possibility if there are any changes from **a** to **b** or from both **a** and point **b**, that must be called compensating or must be trading off (Note- When we are saying compensation principle, we are actually referring to other theories of Hicks and Kaldor that we will be discussing in a short while). So, the weak refers to unobjectionable value judgment. However, had it been a strong case, it would have been some kind of trade-off. In terms of overall social welfare, point **e** is Pareto superior to point **a**.

In the third case, if you start again at point **a** and shift to point **c**. Person A remains in the same indifference curve as he was at **a**, but person B will be shifted to a higher level of utility.



So, at that level, one is at the losing end. One person is better off (i.e., person B is better off), and another is worse off or has no improvement. Here, the shift to point **c** is called strong Pareto improvement. Here, you can just prepare for the objectives, such as the difference between weak and strong Pareto improvements (i.e., Weak versus strong Pareto improvements). That should be noted and must be clarified. Strong means somewhat stronger value judgment. In terms of overall welfare, point **c** is also called Pareto superior to point **a**.

In conclusion, regardless of the starting point, Pareto improvements are always possible as long as there is a different marginal rate of substitutions of X and Y ($MRS_{X,Y}$) for different people.

Further, when the slope of each indifference curve is equal (i.e., $(MRS_{X,Y}^A) = (MRS_{X,Y}^B)$) marginal rate of substitution of A between X and Y is equal to the marginal rate of substitutions of X,Y of B. Or, in terms of ratio, $(MU_{XA} / MU_{YA}) = (MU_{XB} / MU_{YB})$, then such points are called Pareto optimal or Pareto efficient. Based on this equation, you can also prepare these Pareto optimal or efficient combinations.

In the graph, as used in the earlier slides, multiple Pareto optimal allocations are connected with a broken line known as the contract curve, which we already highlighted in the diagram. Once Pareto optimal allocation arrives, further exchanges improve one person's utility by reducing others. Such changes are called Pareto non-comparable as it is not possible to rank its states, like which one person is better than others.

So, one food for thought here is- if the richest people were able to increase their utility while the poor continued to have the same level of utility as before, is this change good? Is it Pareto improvement? So, the clear answer is yes, it is Pareto improvement, although it is against both Egalitarian and Rawlsian perspectives on equity. If you remember, the Rawlsian principle is largely discussed in the context of justice. You can refer to the book 'Theory of Justice'; distributional justice highly emphasises Rawlsian perspectives. We are not discussing it; we have already emphasised in the equity and health chapter in unit number 4.

However, the Pareto principle for value judgment-based economic evaluation also has limitations along with a few advantages. A clear question that can be attempted is whether a government policy that reduces poverty and involves a very small sacrifice by the rich will not be a Pareto improvement? You may cross-check and answer this; it will be interesting.

So, what are the advantages of the Pareto approach? First, it requires minimal information. Second, it requires that only people can rank the options (i.e., bundles of goods) presented to them. These advantages, however, come at the expense of being useless as a criterion for social choice in many (if not all) real-world situations.

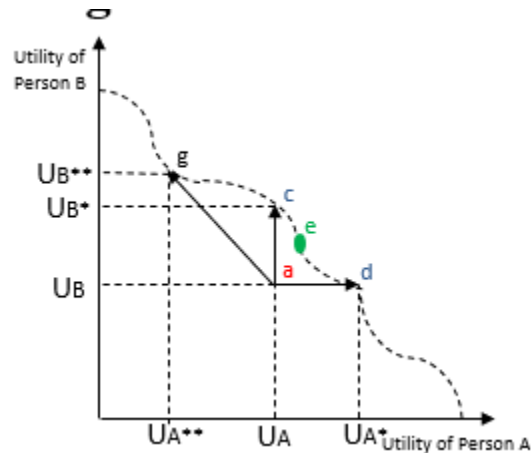
Limitations of the Pareto approach include that Pareto optimal points are widely uneven in some cases. No complete ranking is possible. Once we have reached that contract line, ranking will be very difficult. So, we cannot cope with mixed outcomes: A win or B loss. We cannot even rank all optimal points against each other, for example, points a and f. We cannot even rank all non-optimal points against optimal ones, such as f and c. They cannot even rank optimal points against each other, such as points d and c. This does not allow to compare to any pair involving trade-off, that is, between a and g. All these points are even explained further, through different approaches. I think for all those a b, c, d, g etc., please follow it up and if you have any doubts, do raise your queries.

There are alternative ways to avoid or deal with the limitations. One is by Kaldor and Hicksian criteria, which is largely based on the compensation principle. Clearly, if welfare economics is followed, a practical guide to resource allocation in healthcare would need to go beyond the Pareto principle. Basically, to find out the best possible bundle in terms of resource allocation, we need to go beyond the Pareto principle. To address these, we have used the help of Hicksian's 1939 work and Nicholas Kaldor's 1939 papers. They introduced the compensation test. The criteria offers a way to evaluate and improve upon the Pareto principle shortcomings systematically. The focus is on monetary transfers between gainers and losers. This examines the relative desirability of a policy change. For example, suppose economists aim to evaluate the relative desirability of new state because of a policy intervention compared to a status quo. In this case, the intervention is that a health authority has been assigned with higher amount (i.e., an additional 3 million rupees) by the government. In contrast, the other is cut off from that allotment (around 2 million rupees).

So, the best possible way Hicks suggested is that- the extent to which the losers would be willing to pay gainers to avoid the policy. Since, the gainer has been allotted 3 million rupees, the gainer might be in a position to go by the government's policies. Even if the loser is monopolising enough and pays a bribe to the extent of 2 million. Still, that is not enough compensation to avoid the government policy. As an amount to be compensated should be equivalent, then only there will be justice between two parties to have the best boundary. But till compensation is less than 3 million, I think the policy is considered to be desirable.

Whereas in Kaldor compensation test (it is similar to that of Hicks), they emphasise full compensation for the losers. For example, in the context of the desirability of an outcome of policy interventions. In this case, once again, if the health authorities are allocated with the same 3 million rupees by the government and the other losers 2 million rupees. Kaldor suggests that if the gainer fully compensates the loser of 2 million, everyone will be well off. In other words, 3 million is received and out of that 2 million is given by the gainers to the losers, so the loser is not going to be worse off, his loss is compensated. And the gainer will still be better off by 3 minus 2 i.e., 1 million rupees. Still, the policy which is targeted and supported with the institutions is considered to be effective and policy is supposed to be just desirable.

So, what are the key takeaways in this case? We said that the compensation test links utility and money, bridging the gap between intangible and measurable concepts. Benefits or loss is defined as the maximum or minimum money needed to keep utility constant. The compensation test evaluates policy desirability by adding up monetary gains or losses. They preserve the spirit of Pareto principles, identifying strongly as A gains and B as no worse off and weak if both A and B gain potential Pareto improvement is there. So, the Kaldorian principle or the compensation principle is revisited in this diagram.



This illustrates the compensation test using a utility possibility frontier (UPF). This represents a pair of individual utility labels associated with any allocation of goods within the Edgeworth-Box diagram. This is the same Edgeworth-Box diagram that we applied earlier. This considers the utility points of person A as against B is considered here, as we have seen on the contract curve we have compared with **a** to **g** and we have compared with **a** to **c** and **a** to **d** in our diagram. We have largely discussed about this. I am just plotting the contract curve and somewhere here we started discussing and we discussed about **e** points somewhere here if you remember correctly and we discussed **a** over **c** and **d** point. So, I am just clarifying once again. **e** is a possibility where there is no question of trade-off and both will gain Pareto improvement, but no person is in a position of worse-off or is losing to any extent. Hence, **e** is an improvement, but it is called weak Pareto improvement.

If we are discussing point **c** and point **d**, yes, either person A will be gaining or person B, there will be some trade-off. So, these two points are called strong Pareto optimal points. So, these are all on the contract curve and the label points discussed in the Edgeworth-Box and Pareto optimality example is once again highlighted. Points, off the contract curve in the Edgeworth-Box diagram, i.e., point **a**, is called non-optimal allocation of goods and lies inside the UPF, which we have already discussed. So, we have once again clarified strong Pareto optimality or improvement point and weak Pareto improvement points. The UPF has a negative slope, meaning that from any Pareto optimal allocation, increasing one person's utility cannot occur without making another one worse off.

The compensation test enables ranking from any point within the UPF against any other point on the UPF, addressing non-comparability issues. Especially from the point of view if you mark it very carefully. Here we say, **a** point within the UPF can be ranked against point **g** on the UPF. So, while the shift from **a** to **g** may not directly improve social welfare, it allows for overall efficiency improvements. Transfers can occur between parties A and B, enabling an improvement to a point like **c**, which represents a more efficient allocation. There are key insights that compensation tests provide in a structured way to assess and rank allocations on the UPF, considering a potential gain in efficiency and transfers between parties and contributing to a richer understanding of social welfare implications.

There are limitations to the compensation test, but you can follow it. These important points we have highlighted. Starting with the argument that 'potential compensation but not guaranteed'. This identifies potential Pareto improvements but does not ensure actual compensation, mainly wealth redistribution without compensation. Related to costly negotiations- Compensation may be possible but costly to organise, identifying improvements based on cost-free transfers may not be practical. The third one is related to money as a utility metric, where we use money as a metric of utility. It may not accurately reflect well-being, and the differences in marginal utility of income can yield misleading results regarding money as utility.

The conflicting desirable related limitations of the compensation test is presented here. The test can suggest both change and reversal as desirable. This requires qualifications to address conflicting outcomes, as mentioned in Scitovsky in 1941 paper. Whereby a change is desirable if and only if it is associated with a potential Pareto improvement and a return to the original state is not an option. Last one is on incomplete ranking. This allows ranking between some states but not all. This unable to provide a complete and consistent ranking.

Hence, in this lecture, we discussed two types of evaluation approaches in economics, positive and normative. We understood that healthcare evaluation is normative in nature, and there are two theoretical foundations within normative economics. One is called a welfarist and a non-welfarist. So far, we have been discussing welfarist approaches to normative economic discussions. Within Welfarist, we discussed the Pareto principle and Hicks-Kaldor compensation criteria. Hicks-Kaldor compensation dealt with Pareto's limitations of non-comparing optimal allocation to non-optimal allocation, from an optimal to non-optimal allocation. Both these theories are based only on ordering individual utilities, which is called weak value judgment and does not truly reflect actual social welfare.

So, what is there in the next lecture? It is a non-welfare approach. We will discuss social welfare functions (quantitative in nature) to overcome the limitations of these theories based on social welfare ordering. We will emphasise the concept of non-welfarism and identify the type of social welfare function and the challenges in constructing social welfare. So, largely, the concept of non-welfarism will be discussed.

These are the suggested readings. The bold one is the most highlighted ones. You can refer for more clarifications. So with this, we are going to close here. Thank you for your attendance.